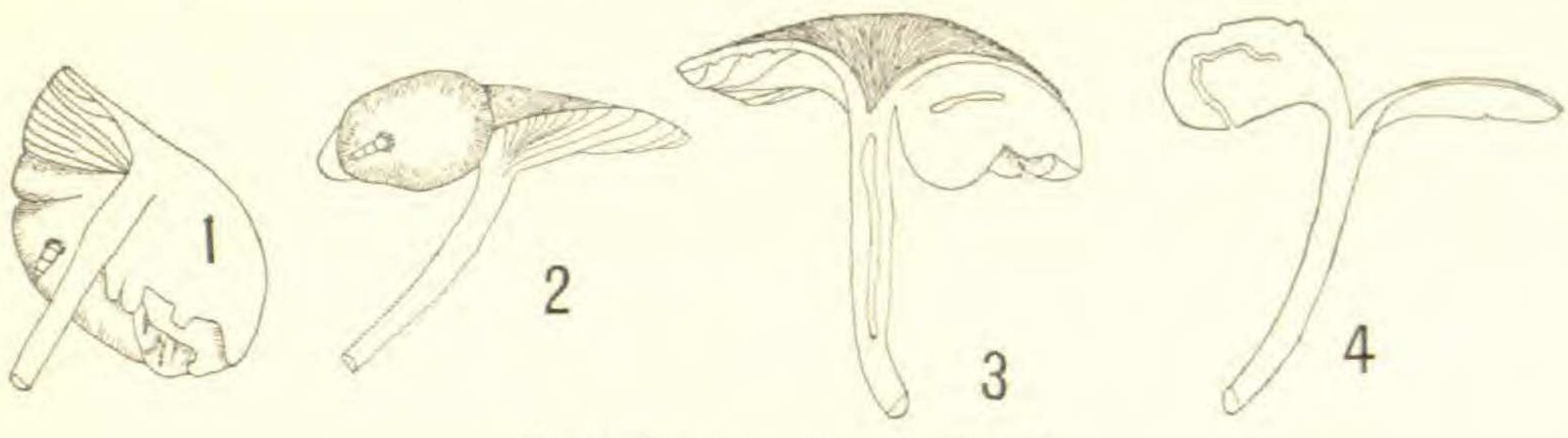
BRIEFER ARTICLES.

A GALL UPON A MUSHROOM.

While collecting fungi in one of the gorges in the neighborhood of Ithaca, September 12, 1902, I found two specimens of the common *Omphalia campanella* affected by a gall insect. Every fungus collector is familiar enough with the destruction of his choicest mushrooms by insect larvae, but in every case that has been recorded, so far as I can determine, the effect of insect attacks has been exclusively destructive. However completely the fungus may be riddled by larvae, there is ordinarily no growth-response whatever on the part of the plant.



Omphalia campanella Batch.

Fig. 1.—Half of pileus affected by gall insect, showing normal gills and gall viewed from below.

Fig. 2.—Same viewed from the side.

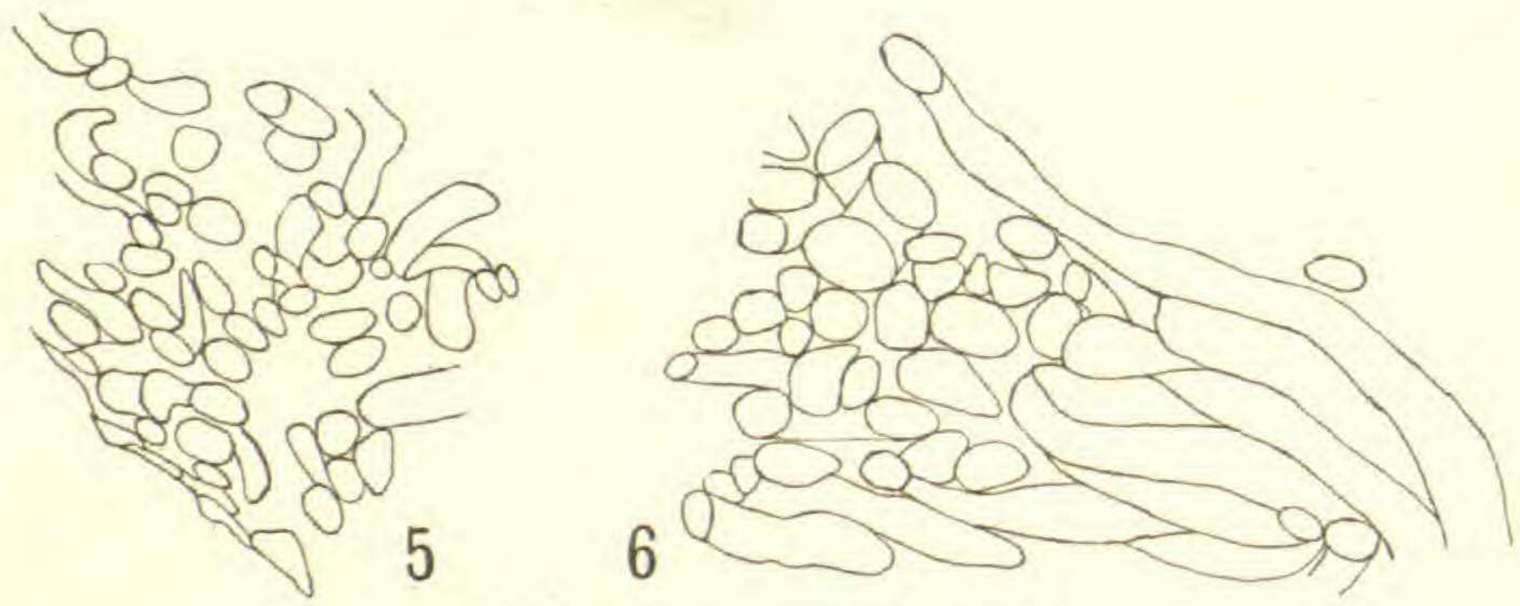
Fig. 3.—Same showing the appearance of the vertical section.

Fig. 4.—Vertical section showing the path of the larva within the gall.

Here we have a very different condition of affairs, as the accompanying figures will show. The normal pileus of *O. campanella* is very thin, in fact less than 1^{mm} in thickness, and with gills attached the entire structure is inside 3^{mm}, as a rule. Here, in contrast, we have a white mass, homogeneous in section, about 8^{mm} in radial diameter, 6^{mm} in thickness, and some 12–15^{mm} in length. Around the ends of the gall, where it adjoins the normal tissue, the even under-surface is broken, as represented in *figs. 1* and *3*, the folds and wrinkles representing gills whose original nature becomes more evident as they approach the normal tissue. The effect upon the upper surface is shown by *fig. 2*. In this the gall causes a marked enlargement, deforming that half of the pileus. The two galls were much alike

in general appearance. There were five larvae in the two together. One of these is sketched in the figures as it was fixed and remained in the opening of its hole. The larvae were determined by Mr. W. A. Riley, of the Department of Entomology of Cornell University, as dipterous larvae of family Mycetophilidae. Further identification was impossible, and since an attempt to cultivate them resulted in the loss of one and the larger part of one gall, the remainder were killed and fixed for study.

To see what changes had occurred in the tissues, portions of one gall were imbedded in paraffin and sectioned for comparison with



Omphalia campanella Batch

FIG. 5.—Camera lucida sketch of normal hyphae.

FIG. 6.—Camera lucida sketch of hyphae from the gall.

sections of a normal Omphalia gathered from the same place. Camera lucida sketches of portions of these sections look at first very much alike. The intercellular spaces are reduced somewhat and the hyphae appear swollen. Measurement of the diameters of a large number of hyphae gives a marked contrast. The average of forty measurements of diameters of cells in the same microscope field was, in the normal tissue, about 7μ; in the gall the average was between 9 and 10μ (*figs. 5*, and *6*). These figures show the stimulating effect of the attack of the gall insect. It has in this case not only produced a relatively very large growth, but has caused a very noticeable increase in the average size of the hyphae (nearly one-third). Hyphae of normal size occur among the swollen threads of the gall, and larger ones are found in the normal tissue, but the averages are strikingly different. A stimulus which is to produce so marked an effect, both in obliterating the lamellae completely and increasing the size of the hyphae themselves, must be applied to the mushroom before gill formation has taken place, else its effect would be destructive, not constructive. It would seem, then, that in these cases the eggs must have been laid very early, so that the abnor-

mal growth kept pace with the larvae, which are comparatively large for so small a mushroom. The hole traced out in *fig. 4* appears to represent the habit of the larva. It has been suggested that most gall insects produce hollow or chambered abnormal growths, and that this may not be a form which habitually produces galls. It is of course possible that the eggs were laid very early and that this stimulus produced a gall, whereas had they been laid later the mushroom would have been destroyed in the ordinary way. The argument that this is a true gall insect would be the size of the gall, and of the larva producing it (5–6 mm at least). Larvae as large as these could not work in the ordinary Omphalia pileus because the flesh is too thin and would not offer sufficient food and protection, which is always sought by the insect in laying eggs. It is at least interesting to find such a gall in a group of plants where such a growth has not been reported in our literature. This note, perhaps will bring similar cases to light.—CHARLES THOM, *Cornell University, Ithaca, N. Y.*

SELECTED NOTES. II.—LIVERWORTS.

DUMORTIERA.—Although the genus Dumortiera has as a whole become greatly reduced in the structure of its gametophyte from the typical Marchantia form, and has, generally, hardly a trace left of the complex chambers and nutritive outgrowths characteristic of the group, there are certain species which show, normally or occasionally, enough resemblance to the typical form to leave no doubt that its simplicity is secondary, acquired through retrogressive development from more complex members of the Marchantiaceae. Of the several species of Dumortiera there is only one in which traces of dorsal chambers have been described. This is *D. irrigua* L., which was studied by Leitgeb[1] from herbarium material only. At the growing point on the upper surface he finds and figures quite distinct chambers, without, however, a very definite mouth opening. The upper covering of the chambers becomes broken and disappears more and more on the older part of the thallus, until finally only the basal parts of the chamber walls are left as reticulations on the surface. Leitgeb also mentions "kürzeren oder längeren Haarpapillen" which occasionally arise from the surface of the thallus and represent the cell rows which fill the air-chambers of Marchantia. Campbell (*Mosses and Ferns*) finds no trace of any such complexities on the thallus of *D. trichocephala* from the

[1] Untersuchungen über die Lebermoose, Heft 6, 1881.